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10/822,716

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Ichiro Kataoka

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EXAMINER

SALZMAN, KOURTNEY R

ART UNIT

PAPER NUMBER

4128

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/822,716	<b>Applicant(s)</b> KATAOKA ET AL.	
	<b>Examiner</b> Kourtney R. Salzman	<b>Art Unit</b> 4128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>August 24, 2004 and July 10, 2006</u> .                       | 6) <input type="checkbox"/> Other: _____                          |



## **DETAILED ACTION**

### ***Summary***

1. This is the initial Office Action based on the Solar Cell Module and Solar Cell Module Array application filed on April 3, 2004, which claims priority from the Japanese Application 2003-112284, filed on April 17, 2003.
2. Claims 1-7 are pending and have been fully considered.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by KATAOKA et al (US 5,530,264).

KATAOKA et al teaches, in column 5, lines 12-21, “an improved photoelectric conversion device and improved photoelectric conversion module each having a multi-layer protecting member including at least a transparent resin layer disposed on the light incident side of the photovoltaic element and a transparent

surface protective layer disposed at the outer-most surface outside said resin layer wherein said transparent resin layer is comprised of a specific fluorine-containing polymer resin". The limitations of claim 1, describing a solar cell element and the front surface member, herein disclosed as a transparent surface protective layer, are clearly taught. Regarding the final limitation of claim 1, KATAOKA et al teaches the use of "corona discharging treatment" to be "conducted for the face of the transparent surface protective layer" in column 9, lines 43-48, as a discharge treatment.

Regarding claim 5, KATAOKA et al discusses the contact surface of the protective layer as an advantage in column 9, lines 22-26. KATAOKA et al states as one advantage to designing the transparent surface layer disposed on the fluororesin layer as "when the transparent surface protective layer is comprised of a resin film of 70° or above in surface contact angle against water, there can be attained a photoelectric conversion device or module having a desirable surface capable of preventing deposition with pollutants".

Regarding claim 6, KATAOKA et al specifically lists possible materials to be used as the fluorine-containing polymer. In column 3, lines 3-6, KATAOKA et al states material examples of "the fluorine-containing polymer thin film as the transparent surface protective film are fluororesin films such as ETFE (ethylene-tetrafluoroethylene copolymer film)..."

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264), as applied to claims 1, 5 and 6 above, in view of MONTMARQUET (US 4,731,156).

KATAOKA et al teach the subject matter of claim 1, as shown in the above rejection, including the corona discharge treatment of the surface of the photoelectric device.

KATAOKA et al fails to disclose the environment in which such a surface treatment takes place.

MONTMARQUET teaches “a process for modifying the surface of fluoropolymers”(column 1, lines 7 and 8) “whenever it is desired to stick something to such materials”(column 1, lines 59-61). MONTMARQUET describes his method as what is “commonly known as plasma etching or reactive ion etching”(column 4, lines 52-54) a process comprising “placing said fluoropolymer in a sealed chamber, introducing a combination of gases including oxygen and ammonia gas into said chamber within a predetermined pressure range, creating a plasma discharge in said chamber during the introduction of gases for an interval sufficient to remove a substantial amount of fluorine from the surface of said fluoropolymer”(column 3, lines 23-34). While oxygen and ammonia gas are described here, MONTMARQUET continues by stating, in column 4, lines 59-64, the “common gases for etching include oxygen, fluorine, chlorine and gases having fluorine and chlorine atoms such as carbon tetrafluoride or carbon tetrachloride. These gases are used alone or in mixtures that may also contain argon, nitrogen or carbon dioxide.”

At the time of invention, one of ordinary skill in the art would have been motivated to modify the fluorine-containing polymer layer of KATAOKA et al to include the polymer treatment of MONTMARQUET because both seek to modify the surface for maximum adhesion. KATAOKA et al uses the discharge treatment in order for the “transparent surface protective layer to be joined to the coating material composed of the foregoing specific fluororesin for the photoelectric conversion

element”, as described in column 9, lines 43-49. MONTMARQUET states the process he describes can be used “whenever it is desired to stick something to such materials as fluoropolymers” in column 1, lines 59-61. Therefore, due to common motivation and teachings, it would have been obvious to one of ordinary skill in the art to combine the teachings of KATAOKA et al and MONTMARQUET to produce increased fluoropolymer adhesion.

9. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264), as applied to claims 1, 5 and 6 above, in view of TAWADA et al (JP 2000-058892) and in further view of NAKAMURA et al (US 6,127,623).

KATAOKA et al teach the subject matter of claim 1, as shown in the above rejection.

KATAOKA et al does not disclose the fluoropolymer layer as being an uneven surface. KATAOKA et al discloses in column 12, lines 33-35, the use of unevenness in the back reflecting layer. KATAOKA et al states “the back reflecting layer is desired to have a roughened surface in order to make incident light to be effectively utilized”.

TAWADA et al teaches a silicon based thin film photoelectric converter comprising an uneven, textured top layer. As shown in figure 1 and described in



the abstract “at least one of the light reflecting metallic film 102 or the surface transparent electrode 2 has a corrugated surface”. The surface transparent electrode is shown in figure 1, in relation to the arrows of reference number 4, which shown the light incidence angle. TAWADA et al discloses in paragraph 4 of the detailed description of the invention section that “photoelectrical conversion efficiency improves” when, with the use of surface unevenness “light is scattered into a photoelectrical conversion by it and the device to which diffused reflection of the light further reflected with the metal electrode is carried out is also made”.

Regarding the first limitation of claim 4 containing the mean height, TAWADA et al teaches, in paragraph 12 of the detailed description of the invention section, “these solar cells have a concavo-convex vertical interval in within the limits which is 0.01-2 micrometers”. This corresponds to the average range described in the pending claim of the instant application.

It would have been obvious to one of ordinary skill in the art to roughen the fluoropolymer surface of KATAOKA et al so that said surface has an unevenness as described in both KATAOKA et al and TAWADA et al in order to improve efficiency of the photoelectric devices, a desire of nearly all solar cell manufacturing as taught by TAWADA et al. (paragraph 4 of the description of prior art section).

Neither KATAOKA et al or TAWADA et al address the limits of height disclosed in the second limitation of claim 4.

Regarding the second limitation of claim 4 containing the maximum height range, NAKAMURA et al discloses a solar cell comprising a light-receptive face with a “projection depth d2 (see FIG. 9(e)) of...above 5 micrometers to about 15 micrometers” in column 2, lines 37-38. Figure 9(e) also shows a high-efficiency solar cell with an uneven top surface on the light-incidence side. NAKAMURA et al uses this to reduce the reflection off the surface(column 1, lines 39-44).

Therefore, at the time of invention, it would have been obvious to one of ordinary skill in the art to combine the fluoropolymer surface of KATAOKA et al as modified by TAWADA et al with the unevenness described in both KATAOKA et al and NAKAMURA et al because both use this technique to improve efficiency of the photoelectric devices, a desire of nearly all solar cell manufacturing as taught by TAWADA et al. (paragraph 4 of the description of prior art section).

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over KATAOKA et al (US 5,530,264), as applied to claims 1, 5 and 6 above, in view of DINWOODIE (US 6,534,703).

KATAOKA et al teach the subject matter of claim 1, as shown in the above rejection.

KATAOKA et al does not disclose the use of the multiple photovoltaic units together.

DINWOODIE teaches “ a PV [photovoltaic] assembly, for use on a support surface” including the “installation of the PV assemblies with the PV module at the proper inclination” in the abstract. DINWOODIE shows in figure 21 and 22 and states in column 6, lines 54-55, the common angle of inclination for a PV assembly, or angle 146 in these figures, “is typically about 5 degrees to 30 degrees”.

At the time of invention, it would have been obvious to one of ordinary skill in the art, to use the solar cell described in detail by KATAOKA et al in a multiple photovoltaic cell assembly and inclination setup of DINWOODIE so that the collection of energy is increased. Further, it would have been obvious to adjust the solar panel installation inclinations, typically 5-30 degrees as suggested by DINWOODIE, as solar incident rays change based on multiple factors, including the global location and time of the year.

***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kourtney R. Salzman whose telephone number is (571) 270-5117. The examiner can normally be reached on Monday to Friday 8AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

hrs

/Barbara L. Gilliam/  
Supervisory Patent Examiner, Art Unit 4128